Yiming Che

+1(607)-338-8871 — yche1@binghamton.edu — homepage — github

PROFESSIONAL SKILLS & KNOWLEDGE

- **Programming Languages:** Python, Matlab, R

- **Skills:** Linux, Slurm, Git, MySQL, Bash script

- **Research Interests:** Generative models, Medical imaging, Bayesian statistics, Active learning

EDUCATION BACKGROUND

- **Binghamton University, State University of New York, NY, United States**
  Department of Systems Science and Industrial Engineering
  Doctor of Philosophy in Systems Science   May 2023
  Advisor: Dr. Changqing Cheng

- **Binghamton University, State University of New York, NY, United States**
  Department of Systems Science and Industrial Engineering
  Master of Science in Industrial Engineering   May 2018

- **Capital University of Economics and Business, Beijing, China**
  Department of Industrial Engineering
  Bachelor of Science in Industrial Engineering   July 2017

PROFESSIONAL EXPERIENCE

- **Postdoctoral Scholar at Arizona State University** (Advised by Dr. Teresa Wu)   2023-Present

  - **Weakly-supervised Brain Tumor Segmentation**
    - Developed a weakly-supervised brain tumor segmentation framework using diffusion models
    - Proposed a novel hyperparameter selection method without ground truth
  - **Interpretable Medical Image Classification**
    - Trying to utilizing diffusion models as interpretable medical image classifier with conterfactual
  - **Multi-modality Fusion for Headache Diagnosis**
    - Utilized CLIP model for multi-modality fusion in headache diagnosis
  - **Biomedical Age Prediction with Epigenetic Data for Alzheimer's Disease Detection**
    - Prepared NIH RO1 grant proposal
    - Utilized Cycle-GAN model for epigenetic data translation
    - Utilized epigenetic data for biomedical age prediction

- **Research Assistant at Binghamton University** (Advised by Dr. Changqing Cheng)   2019-2023

  - **COVID Outbreak Prediction**
    - Physics-informed neural network (PINN) for the prediction of COVID outbreak
      - Included Bayesian framework in traditional PINN for robust prediction
  - **Surrogate Modeling and Active Learning/Sequential Design**
    - Developed a novel surrogate model which combines generalized polynomial chaos and stochastic kriging model for efficient surrogate modeling of stochastic systems
      - Significantly reduced computational budget and without loss of accuracy

- Developed single-section and batch-selection sampling algorithms with Gaussian process
  - Significantly reduced the size of training set for efficient surrogate modeling
- **Uncertainty Quantification for Machining Process**
  - Developed uncertainty quantification framework using generalized polynomial chaos expansion for machining process
    - Reduced computational budget of time-domain simulations for uncertainty quantification

AWARD & HONOR

- 2023 Distinguished Dissertation Award, Binghamton University   2024
- Excellence in Systems Science Research Award, Binghamton University   2023
- Graduate School Travel Grant, Binghamton University   2022
- INFORMS Bonder Foundation Award   2021
- Finalist, IISE-DAIS Mobile App Competition at 2021 IISE Annual Conference and Expo   2021
- Binghamton University Graduate Student Excellence Award in Research (**top 1%**)   2021
- Travel Grant of Midwest Dynamical Systems Conference 2019, University of Illinois at Chicago   2019
- Second Place, Best Student Paper Competition at 2019 IISE Annual Conference and Expo
  (Healthcare track)   2019
- Honorable Mention, Binghamton University Research Day Poster Competition, 2018   2018
- National Scholarship, Capital University of Economics and Business   2015

WORKING PAPERS

1. "Unsupervised headache subtype discovery using diffusion model"

2. "Harmonizing florbetapir and PiB PET measurements using modified Cycle-GAN model"

3. "Enhanced traumatic brain injury recovery classification with harmonized brain MRI and CT"

4. "Improving headache detection on small T1-weighted MR dataset using pretrained large-scale contrastive language-image model"

PUBLICATIONS

1. Shah, J., Krell-Roeschc, J., **Che, Y.**, Forzanie, E., Knopmanf, D.S., Cliff, R.J., Petersenc, R.C., Wu, T. and Geda, Y.E. "Predicting cognitive decline from neuropsychiatric symptoms and Alzheimer's disease biomarkers: A machine learning approach to a population-based data" *Journal of Alzheimer's Disease* (Under review)

2. **Che, Y.**, Rafsani, F., Shah, J., Siddiquee, M. M. R. and Wu, T. "AnoFPDM: Anomaly segmentation with forward Process of diffusion models for brain MRI" (submitted to WACV 2025).

3. Wan, J., Kataoka, J., Sivakumar, J., Pena, E., **Che, Y.**, Sayama, H. and Cheng, C. "Sparse Bayesian learning for sequential inference of network connectivity from Small Data" *IEEE Transactions on Network Science and Engineering* (In press)

4. **Che, Y.**, Muller, J. and Cheng, C. "Dispersion-enhanced sequential batch sampling for contour estimation," *Quality and Reliability Engineering International* 40 (2024): 131–144. https://doi.org/10.1002/qre.3245

5. **Che, Y.** and Cheng, C. "Physical-statistical learning towards resilience assessment for power generating systems," *Physica A: Statistical Mechanics and its Applications* 615 (2023): 128584. https://doi.org/10.1016/j.physa.2023.128584

6. Ma, Q., **Che, Y.**, Cheng, C. and Wang, Z. "Characterizations and optimization for resilient manufacturing systems with considerations of process uncertainties," *Journal of Computing and Information Science in Engineering* 23.1 (2023): 1-30. https://doi.org/10.1115/1.4055425

7. Wan, J., **Che, Y.**, Wang, Z. and Cheng, C. "Uncertainty quantification and optimal robust design for machining operations," *Journal of Computing and Information Science in Engineering* 23.1 (2023): 0110005. https://doi.org/10.1115/1.4055039

8. **Che, Y.** and Cheng, C. "Active learning and relevance vector machine in efficient estimate for basin stability of dynamic networks," *Chaos: An Interdisciplinary Journal of Nonlinear Science* 31.5 (2021): 053129. https://doi.org/10.1063/5.0044899.

9. **Che, Y.**, Guo, Z. and Cheng, C. "Generalized polynomial chaos-informed efficient stochastic Kriging," *Journal of Computational Physics* 445 (2021): 110598. https://doi.org/10.1016/j.jcp.2021.110598.

10. Wu, X., Zheng, Y., **Che, Y.** and Cheng, C. "Pattern recognition and automatic identification of early-stage atrial fibrillation," *Expert Systems with Applications* 158 (2020): 113560. https://doi.org/10.1016/j.eswa.2020.113560.

11. **Che, Y.**, Cheng, C., Liu, Z. and Zhang, Z. "Fast basin stability estimation for dynamic systems under large perturbations with sequential support vector machine," *Physica D: Nonlinear Phenomena* 405 (2020): 132381. https://doi.org/10.1016/j.physd.2020.132381.

12. **Che, Y.**, Liu, J. and Cheng, C. "Multi-fidelity modeling in sequential design for identification of stability region in dynamic time-delay systems," *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29.9 (2019): 093-105. https://doi.org/10.1063/1.5097934.

13. **Che, Y.** and Cheng, C. "Uncertainty quantification in stability analysis of chaotic systems with discrete delays," *Chaos, Solitons & Fractals* 116 (2018): 208-214. https://doi.org/10.1016/j.chaos.2018.08.024.

PROFESSIONAL SERVICES

- Conference Reviewer
    - Medical Image Computing and Computer Assisted Intervention (MICCAI)
    - International Conference on Automation Science and Engineering (CASE)

- Journal Reviewer
    - Physica D: Nonlinear Phenomena

- Student member, Student leadership board at IISE   Mar. 2021-2022

- Vice president, ASQ Binghamton chapter   Aug. 2019-2022